



# UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE  
 United States Patent and Trademark Office  
 Address: COMMISSIONER FOR PATENTS  
 P.O. Box 1450  
 Alexandria, Virginia 22313-1450  
 www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/744,793	06/11/2002	Said Mansour	7024499PUR93	4646

7590 01/20/2004  
 James B Myers  
 Woodard Emhardt Naughton Moriarty & Mcnett  
 Bank One Center/Tower Suite 3700  
 111 Monument Circle  
 Indianapolis, IN 46204

EXAMINER

GAKH, YELENA G

ART UNIT	PAPER NUMBER
----------	--------------

1743

DATE MAILED: 01/20/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

# Office Action Summary

Application No.

09/744,793

Applicant(s)

MANSOUR ET AL.

Examiner

Yelena G. Gakh, Ph.D.

Art Unit

1743

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

## Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

## Status

- 1) ☒ Responsive to communication(s) filed on 28 November 2003.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

## Disposition of Claims

- 4) ☒ Claim(s) 1-53 is/are pending in the application.
- 4a) Of the above claim(s) 2,8,9,18-35 and 47-53 is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1,3-7,10-17 and 36-46 is/are rejected.
- 7) ☒ Claim(s) 16 and 36 is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

## Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 06 June 2002 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

## Priority under 35 U.S.C. §§ 119 and 120

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some \* c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
  - ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  - ☒ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- \* See the attached detailed Office action for a list of the certified copies not received.
- 13) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application) since a specific reference was included in the first sentence of the specification or in an Application Data Sheet. 37 CFR 1.78.
- a) ☐ The translation of the foreign language provisional application has been received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121 since a specific reference was included in the first sentence of the specification or in an Application Data Sheet. 37 CFR 1.78.

## Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO-1449) Paper No(s) 02/11/02.
- 4) ☐ Interview Summary (PTO-413) Paper No(s) \_\_\_\_\_.
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other:

Art Unit: 1743

### DETAILED ACTION

1. Election filed on 11/28/03 is acknowledged. The examiner indicates an obvious mistake that was made in restriction requirements, i.e. claim 2 was listed in both restrictable groups of claims (Groups I and II). The mistake is corrected in the telephone interview with James B. Myers on 01/08/04. Elected Group I should contain claims 1, 3-7, 10-17 and 36-46.

The examiner will consider publications from the submitted IDS, which were not considered in the present examination, upon receiving references.

### *Claim Objections*

2. Claims 16 and 36 are objected to because of the following informalities: the claims recite abbreviations YSZ and PZT, which must be accompanied by complete names, e.g. "yttria stabilized zirconia" and " $\text{PbZr}_x\text{Ti}_y\text{O}_3$ " (a definition of PZT given in the specification). Appropriate correction is required.

### *Claim Rejections - 35 USC § 112*

3. The following is a quotation of the first paragraph of 35 U.S.C. 112:

The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

4. Claims 1, 3-7 and 15-17 are rejected under 35 U.S.C. 112, first paragraph, because the specification, while being enabling for ferroelectric metal oxide sensing member made of YSZ material which has the composition of " $\text{Y}_x\text{Zr}_{1-x}\text{O}_2$  where x is in the range of 0.0 to 0.15" or made of  $\text{PbZr}_x\text{Ti}_y\text{O}_3$  composition with  $x+y=1$ , does not reasonably provide enablement for any other ferroelectric metal oxide. The specification discloses enablement for oxygen sensors operating at temperatures lower than 400 °K limited to indicated particular compositions. No other compositions are disclosed as being enabled by the specification; the specification does not provide any guidance of how to obtain other compositions for oxygen sensors operable at

Art Unit: 1743

temperatures lower than 400.<sup>o</sup>K; it would be an undue experimentation for any routiner in the art to develop enabled compositions other than those disclosed in the specification.

Claims 10-14 and 44-45 are rejected under 35 U.S.C. 112, first paragraph, because the specification, while being enabling for  $x+y = 1$  in each  $\text{PbZr}_x\text{Ti}_y\text{O}_3$  composition, does not reasonably provide enablement for any other combination of  $x$  and  $y$ . The specification does not enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to use the invention commensurate in scope with these claims. In order to have three atoms of oxygen in the composition  $\text{PbZr}_x\text{Ti}_y\text{O}_3$ , the sum  $x+y$  should be equal 1.

5. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

6. Claims 1, 3-4, 10-16, 36-37 and 41-46 are rejected under 35 U.S.C. 112, second paragraph, as being incomplete for omitting essential elements, such omission amounting to a gap between the elements. See MPEP § 2172.01. The omitted elements are: metallic electrodes and/or a circuit electrically coupled to a sensing member. Metallic electrodes and/or electric circuit are required for an oxygen sensor to be operable, see e.g. Applications: Oxygen Sensors.

Claims 17 and 46 are rejected under 35 U.S.C. 112, second paragraph, as being incomplete for omitting essential steps, such omission amounting to a gap between the steps. See MPEP § 2172.01. The omitted steps are: steps comprising measurement of a specific physical parameter reflecting changes in oxygen content, e.g. voltage, and correlating these changes with the oxygen content.

### ***Claim Rejections - 35 USC § 102***

7. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless —

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

Art Unit: 1743

8. **Claims 1, 3-7 and 15-16** are rejected under 35 U.S.C. 102(b) as being anticipated by Miahara et al. (J. Appl. Phys., 1988, IDS).

Miahara discloses an apparatus comprising an oxygen sensor including a ferroelectric metal oxide sensing member, Pt/YSZ system in particular, and electric circuit coupled to this member, operable at room temperature.

9. **Claims 1, 3-7 and 15-17** are rejected under 35 U.S.C. 102(b) as being anticipated by Friese et al. (US 5,334,350).

Friese discloses "a resistance probe to determine the oxygen content in gas mixtures, the resistance probe including a sensor carrier body comprising the following superposed layers: an insulating ceramic substrate; an electrode layer including a pair of electrodes; a semiconductor layer, which is capable of functioning as a gas sensor, and which is in electrical contact with said pair of electrodes; at least one covering sheet disposed on said pair of electrodes and containing at least one recess in which said semiconductor layer is disposed on said pair of electrodes and which allows a gas mixture to pass through to said semiconductor layer; and a ceramic covering disposed in said at least one recess and on, and completely covering, the semiconductor layer, with the ceramic covering being a porous engobe protective layer" (Claim 1). "A resistance probe according to claim 1, wherein the porous engobe protective layer contains as its inorganic components one of aluminum titanate and mixtures of aluminum titanate with at least one of titanium dioxide, zirconium dioxide, **yttrium stabilized zirconium dioxide**, magnesium spinel, and zirconium titanate" (Claim 2). The "equation shows that, with a **constant ambient temperature**, the resistance of the sensor is an exclusive function of the oxygen concentration" (col. 5, lines 18-20).

10. **Claims 1, 3-7, 10, 13-14, 36-39 and 44-45** are rejected under 35 U.S.C. 102(b) as being anticipated by Cattani et al. (J. Vac. Sci. Technol., A, 1993<sup>IDS</sup>).

Cattani discloses ferroelectric PZT films, particularly of  $\text{Pb}(\text{Zr}_{0.55}\text{Ti}_{0.45})\text{O}_3$  composition deposited on platinum electrodes, which corresponds to the structure of an apparatus recited in the claims and intrinsically possesses properties of oxygen sensor, particularly for ambient temperatures. Apparatus claims must be structurally distinguishable from the prior art in terms of structure not function. *In Re Danley*, 120 USPQ 528,531 (CCPA 1959); *Hewlett-Packard Co. V. Bausch and Lomb, Inc.*, 15 USPQ2d 1525, 1528 (Fed.Cir. 1990).

Manner of operating the device does not differentiate apparatus claim from the prior art – if the prior art apparatus teaches all of the structural limitations of the claim. *Ex Parte Masham*, 2USPQ2d 1647 (BPAI 1987).

11. **Claims 36-40** are rejected under 35 U.S.C. 102(b) as being anticipated by Krishnamurthy et al. (Proceedings of SPIE, 1996, Abstract) or Lee et al. (Proceedings of SPIE, 1997, Abstract).

Krishnamurthy and Lee disclose pyroelectric thermal sensors or piezoelectric sensors prepared with PZT ceramics, comprising Au electrodes and electric circuit for varying electric field, which corresponds to the structure of the apparatus recited in claims 36-40 and therefore intrinsically possess its properties, (see the arguments in the previous subparagraph).

### ***Claim Rejections - 35 USC § 103***

12. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

13. The factual inquiries set forth in *Graham v. John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

14. This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later

Art Unit: 1743

invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

15. **Claims 17** is rejected under 35 U.S.C. 103(a) as being unpatentable over Leibold et al. (NATO ASI Series, 1989) in view of Miahara.

Leibold discloses an apparatus comprising an oxygen sensor including a ferroelectric metal oxide sensing member, Pt/YSZ system in particular, and electric circuit coupled to this member, operable in a temperature range 300-1000 °C, rather than 127 °C.

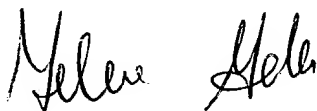
It would have been obvious for anyone of ordinary skill in the art to modify Leibold's apparatus by incorporating Miahara's sensor adjusted for using in a vehicle, because this lowers the operable temperature for the sensor and makes the apparatus more convenient for use.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Yelena G. Gakh, Ph.D. whose telephone number is (571) 272-1257. The examiner can normally be reached on 9:30 am - 6:00 pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Jill A. Warden can be reached on (571) 272-1267. The fax phone number for the organization where this application or proceeding is assigned is (703) 872-9306.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (571) 272-1700.

Yelena G. Gakh, Ph.D.  
1/12/04

Handwritten signature of Yelena G. Gakh in cursive script.